

# “Critical Factors of Total Quality Management and Its Effect on Performance in Health Care Industry: A Turkish Experience”

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## Critical Factors of Total Quality Management and Its Effect on Performance in Health Care Industry: A Turkish Experience

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### Abstract

The literature on quality contains numerous case studies of successful companies and descriptions of quality concepts and quality improvement programs. The purpose of this study is to determine the critical factors of total quality management in the healthcare sector and to measure the effect of critical factors of total quality management on business performance in small and medium size hospitals in Turkey. The instrument used in this study was developed to identify critical factors (areas) of total quality management in the hospital industry. The technique of canonical correlation analysis is employed to investigate this relationship. To measure the eight dimensions of total quality management, thirty items were measured by using a five point Likert scale, ranging from "very low" to "very high". Performance of the hospital was measured using by subjective measures based on hospital administrators' perception of how their organization performed relative to the competition. Data analysis indicated a positive correlation between the performance of the hospital and the four critical factors of quality management in Turkish healthcare industry.

**Key words:** Total quality management, Canonical correlation, Business performance.

### Introduction

In today's changing and developing global world, both service and manufacturing companies are confronted with a challenging and increasingly competitive environment. This competition focuses on before and after sales services rather than products' attributes and manufacturing (Sivadas & Baker-Prewitt, 2000).

Today, service industries are dominant in developed countries and are among the fastest growing sector even in the emerging countries. The service sector also approximately accounts for 60 or 70 percentage of the total worldwide GNP (Franklin, 1997). Due to the phenomenal growth of the service sector in modern society, the importance of service management and marketing is also expected to increase (Yavas, Bilgin & Shemwell, 1997), (Camison, 1996), (Bates, Bates, Johnston, 2003). Since its emergence, the basic concept of service management has continued to change. Two major changes in the concept include: (a) a shift from an interest in the internal consequences of performance (e.g., internal efficiency – productivity of labor and profits) to an interest in the external consequences (e.g., consumer behavior- customer satisfaction, loyalty), and (b) a shift from focus on structure to a focus on process. Thus, marketers and managers now focus on the process of service production and consumption as it governs consumer behavior in the service industry where services are produced and consumed simultaneously with active participation of the consumer.

The change in the conceptual paradigm within service marketing and management has motivated many scholars to research the issues of service quality. Providing quality service is not only the most important factor for consumer satisfaction, it is also the principal criterion that measures the competitiveness of a service organization. Whereas the marketing textbooks stress the four P's of marketing, namely, *product*, *place*, *promotion*, and *price*, in a service business none of these work very well without a Q for quality (Youssef & Bovaird, 1996).

Quality has become one of the most important factors in global competition today. Intensifying global competition and increasing demand by customers for better quality have caused more and more companies to realize that they will have to provide quality product and /or services in order to successfully compete in the marketplace. To meet the challenge of this global revolution, many businesses have invested substantial resources in adapting and implementing total qual-

ity management (TQM) strategies. TQM is defined as an action plan to produce and deliver commodities or services, which are consistent with customers' needs or requirements by better, cheaper, faster, safer, easier processing than competitors with the participation of all employees under top management leadership.

The role of total quality management is widely recognized as being a critical determinant in the success and survival of an organization in today's competitive environment. Any decline in customer satisfaction due to poor service quality would be a matter of concern. Consumers are becoming increasingly aware of rising standards in service quality, prompted by competitive trends which have developed higher expectations (Yavas & Shemwell, 2001).

In recent years, one of the fastest growing industries in the service sector is the healthcare industry. In the healthcare industry, all hospitals provide the same type of service, but they do not provide the same quality of service. To achieve service excellence, hospitals must strive for zero defects, retaining every customer that the company can profitably serve. Zero defects require continuous efforts to improve the quality of the service delivery system (Lim & Tang, 2000).

The purpose of this study is to determine the critical factors of total quality management in the healthcare sector and to measure the effect of critical factors of total quality management on business performance in small and medium size hospitals in Turkey.

## **Literature Review of Total Quality Management**

Although the literature on total quality management includes a rich spectrum of research, there is no consensus on the definition of quality. The notion of quality has been defined in different ways by different authors. Gurus of the total quality management disciplines such as Garvin, Juran, Crosby, Deming, Ishikawa and Feigenbaum defined the concept of quality and total quality management in different ways. Garvin proposed a definition of quality in terms of the transcendent, product based, user based, manufacturing based and value based approaches. Garvin also identified eight attributes to measure product quality (Garvin, 1987). Juran defined quality as "fitness for use". Juran focused on a trilogy of quality planning, quality control, and quality improvement (Mitra, 1987). Crosby defined quality as "conformance to requirements or specifications" (Crosby, 1996). According to Crosby, requirements are based on customer needs. Crosby identified 14 steps for a zero defect quality improvement plan to achieve performance improvement. According to Deming, quality is a predictable degree of uniformity and dependability, at low cost and suited to the market. Deming also identified 14 principles of quality management to improve productivity and performance of the organization (Deming, 1986). Ishikawa also emphasized importance of total quality control to improve organizations' performance. He contributed to this area by using a cause and effect diagram (Ishikawa diagram) to diagnose quality problems (Mitra, 1987). Feigenbaum described the concept of organization-wide total quality control. Feigenbaum was the first user of total quality control concept in the quality literature. He defined quality as "the total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectations by the customer" (Mitra, 1987). Major common denominators of these quality improvement plans include management commitment, strategic approach to a quality system, quality measurement, process improvement, education and training, and eliminating the causes of problems.

Total quality management is the culture of an organization committed to customer satisfaction through continuous improvement. This culture varies both from one country to another and between different industries, but has certain essential principles which can be implemented to secure greater market share, increased profits, and reduced costs (Kanji & Wallace, 2000). Management awareness of the importance of total quality management, alongside business process reengineering and other continuous improvement techniques was stimulated by the benchmarking movement to seek, study, implement and improve on best practices (Zairi & Youssef, 1995). The commitment to continuous improvement historically originated in manufacturing firms; but spread quickly to the service sector (e.g. teller transactions in banks, order processing in catalog firms, etc.). Surveys point at the widespread interest and application of TQM:

- 95% of manufacturing companies and 70% of service companies have used one form or other of quality improvement programs and 55% of American executives and 70% of Japanese executives use quality improvement information at least monthly (Olion & Rynes, 1991), (Rigby, 1998).
- An international survey of over 4000 managers in 15 countries indicated TQM usage by approximately 60% in 1997 (Rigby, 1998). A Survey of TQM and continuous improvement programs indicates 12 common aspects: Committed leadership, adoption and communication of TQM, closer customer relationships, benchmarking, increased training, open organization, employee empowerment, zero defects mentality, flexible manufacturing, process improvement, and measurement (Powel, 1995).

Furthermore, to determine critical factors of total quality management, various studies have been carried out and different instruments were developed by individual researchers and institutions such as Malcolm Baldrige Award, EFQM (European Foundation For Quality Management), and the Deming Prize Criteria. Based on these studies, a wide range of management issue, techniques, approaches, and systematic empirical investigation have been generated.

Accordingly, Saraph, Benson & Schroder, (1989) developed 78 items, which were classified into eight critical factors to measure the performance of total quality management in an organization. These critical factors are: Role of divisional top management and quality policy, role of the quality department, training, product and service design, supplier quality management, process management, quality data and reporting, and employee relations.

Flynn, Schroeder & Sakakibara, (1994) developed another instrument to determine critical factors of total quality management. Flynn et al. identified seven quality factors. These are top management support, quality information, process management, product design, workforce management, supplier involvement, and customer involvement. As it is seen, this instrument is very similar to the preceding instrument that was developed by Saraph et al. (1989). Flynn, Schroeder & Sakakibara, (1995) measured the impact of total quality practices on quality performance and competitive advantage.

In another noteworthy study, Anderson, Rungtusanatham & Schroeder, (1994) developed the theoretical foundation of quality management practice by examining Deming's 14 points. They reduced the number of concepts from 37 to 7 using the Delphi Method. These are visionary leadership, internal and external cooperation, learning, process management, continuous improvement, employee fulfillment, and customer satisfaction.

Black & Porter (1996) also identified critical factors of the total quality management using the Malcolm Baldrige Award criteria and investigated their validity by empirical means. They developed 32 items, which were classified into ten critical factors. These factors are: Corporate quality culture, strategic quality management, quality improvement measurement systems, people and customer management, operational quality planning, external interface management, supplier partnerships, teamwork structures, customer satisfaction orientation, and communication of improvement information. Various authors have also assessed the validity of Malcolm Baldrige Award Criteria (Wilson & Collier, 2000), (Flynn & Saladin, 2001).

Ahire, Golhar, & Waller (1996) developed twelve integrated quality management constructs through detailed analysis of literature to determine critical factors of quality management of organizations. Ahire et al. identified twelve factors. These are supplier quality management, supplier performance, customer focus, statistical process control usage, benchmarking, internal quality information usage, employee involvement, employee training, design quality management, employee empowerment, product quality, and top management commitment.

### **Measuring Performance Through TQM Criteria**

Performance measurement is very important for the optimum management of an organization. According to Deming, without measuring something, it is impossible to improve it. Therefore, to improve organizational performance, one needs to determine the total quality management criteria and measure their effect on business performance ( Madu, Kuei, Jacob, 1996), (Gadenne, Sharma, 2002).

Traditionally, success of business performance has been measured financially. Profit, market share, earnings, and growth have been regarded as critical indicators of business performance. Kaplan & Norton (1996) emphasized that financial indicators measure past performance only. Therefore, in order to overcome shortcomings of traditional business performance systems, they added non-financial categories to the traditional performance measurement system.

Both manufacturing and service sector literature contain a considerable number of studies that measure business performance through total quality management criteria (Samson and Terziovski, 1998), (Flynn, Schroeder & Sakakibara, 1995), (Wilson & Collier, 2000), (Fynes & Voss, 2001), (Flynn & Saladin, 2001), (Azaranga, Gonzalez & Reavill, 1998), (Montes, Jover & Fernandez, 2003), (Benson, Saraph, Schroeder, 1991), (Stein, 1998), (Choi, Eboch, 1989). While these works explore a variety of theoretical and empirical issues, the general conclusion is that if TQM plan is implemented properly, it produces a variety of benefits such as understanding customers' needs, improved customer satisfaction, improved internal communication, better problem solving, fewer errors, and so on.

While many firms all over the world have invested substantial resources in adapting and implementing TQM programs to improve their performance, many of them did not achieve any improvement and some only a little. Specifically, due to the presence of a multitude of barriers, many healthcare organizations utilize only a partial implementation of TQM, and hence are unable to achieve continuous and systematic improvement (Nwabueze & Kanji, 1997), (Zabada, Asubonteng, Munchus, 1998). In these studies, two main culprits were identified. The first was the uncertain definition of TQM. The second was the inappropriate implementation of TQM (Hansson & Ericsson, 2002). Despite this lack of success, many researchers found that TQM is still a very important source for improving the organizational performance of hospitals. Particularly, quality management has become an important issue in the healthcare sector after 1980 (Kunst & Lemming, 2000), (McAlexander, Keldenberg, Koenig, 1994), (Kenagy, Berwick, Shore, 1999), (Andaleeb, 2001), (Eggl, Halfon, 2003), (Butler, Leong, 2000), (Yasin, Meacham, Alavi, 1998), (Li, 1997), (Yang, 2003), (Meyer, Collier, 2001), (Ovretveit, 2001), (Brashier, Sower, Motwani, Savoie, 1996).

As explained above, total quality management focuses on processes rather than results. Therefore, after determining the improvement area in the organization and taking the corrective actions, the results will be high quality products or services.

## **The Model**

We will employ a model that is based on the relationships between the critical factors of total quality management and their effect on business performance in health care sector. This model is shown in Figure 1 below.

### ***Methodology***

#### ***The Sample***

For the empirical research, we selected as our universe the private and state hospitals in Turkey. Data for this study were collected by using a questionnaire that was distributed to 150 chief administrative officers of healthcare institutions in Turkey. 50 useable questionnaires were returned giving a response rate of 33 percent, which was considered satisfactory for subsequent analysis.

#### ***The research instrument***

The instrument used in this study was developed by Jayant V. Saraph, P. George Benson, and Roger G. Schroeder with the purpose of identifying critical factors (areas) of total quality management in a business unit adapted by Raju, Lonial for use in the hospital industry (Raju & Lonial, 2002).

However, in the present questionnaire, the eight critical factors were reduced to four. The basic justification for this lies in the researchers' impression (derived from the pilot study) that the hospital sector is in the "awakening" stage described by Crosby (Crosby, 1996). Our interviews corroborated that management "recognized that quality management may be of value but was not willing to provide money or time to make it all happen, teams were set up to attack major prob-

lems instead of soliciting long range solutions”, and that company quality posture could be summarized as “is it absolutely necessary to always have problems with quality?”. These signified a very close alignment with the “awakening” stage of Crosby’s stages of maturity.

As is typical of this stage, none of the hospitals in the sample reported an established quality department or relevant training programs. Consequently, three critical factors, namely role of quality department, training, and product and service design were excluded from the questionnaire. A fourth critical factor, supplier quality management, was also omitted since the Turkish Ministry of Health requires hospitals to award contracts to vendors who are the lowest bidders as long as they satisfy certain specifications. As Deming points out, this practice overrules any concern on the part of companies to review the bidders’ approaches to quality control (Deming, 1986). A second section in the questionnaire measures business performance criteria.

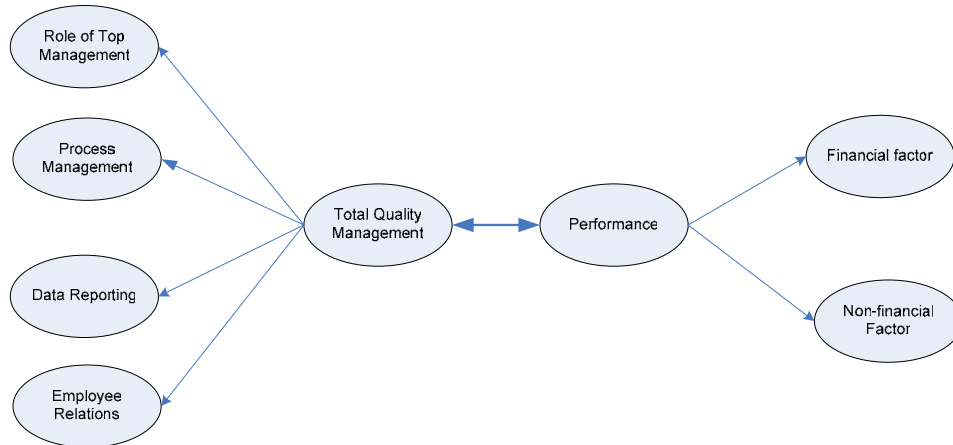


Fig. 1. The Model

The original version of the questionnaire was in English. This questionnaire was translated into the local language (Turkish). The local version was retranslated until a panel of experts agreed that the two versions were matched (Albaum, Strandkov & Duerr, 2002). Each item was rated on a five-point Likert scale, ranging from “very low” to “very high”. The questionnaire was pre-tested several times to ensure that the wording, format, and sequencing of questions were appropriate. Occasional missing data on variables were handled by replacing them with the mean value. The percentage of missing data across all data was calculated to be relatively small. The questionnaire is given in Appendices A and B.

#### *Analysis and Results*

The analysis of the data is conducted at three steps:

1. Performing an exploratory factor analysis with varimax rotation to determine the critical factors of the total quality management.
2. Performing an exploratory factor analysis with varimax rotation to determine the factors of business performance criteria.
3. Using canonical correlation analysis measuring the effect of critical factors of total quality management on business performance. These steps are discussed in greater detail in the next section.

#### ***Determining critical factors of total quality management using Exploratory Factor Analysis***

Exploratory factor analysis with varimax rotation was performed on the total quality management criteria in order to extract the dimensions underlying the construct. The factor analysis of the 30 variables yielded four factors explaining 83.953% of total variance. Only eleven of the thirty items loaded on these four factors and, based on the items loading on each factor, the factors were labeled “*Role of divisional top management and quality policy*” (Factor 1), “*Process*

*management*” (Factor 2), “*Quality data and reporting*” (Factor 3), “*Employee relations* (Factor 4). These eleven items are shown in Table 1.

Table 1

Factor analysis of total quality management criteria

Variables	Factors			
	1	2	3	4
Extent to which top executives assume responsibility for quality performance	0.910			
Extent to which top management has objectives for quality performance	0.888			
Extent to which top management has developed and communicated a vision for quality as part of a strategic vision of the organization	0.569			
Amount of preventive equipment maintenance		0.762		
Amount of inspection, review, or checking of work		0.902		
Clarity of work or process instructions given to employees		0.752		
Availability of quality data (mortality, morbidity)			0.892	
Extent to which quality data are used as tools to manage quality			0.868	
Scope of the quality data includes clinical performance			0.700	
Extent to which quality awareness building among employees is on-going				0.844
Extent to which employees are recognized for superior quality performance				0.859

These items were factor analyzed to see if they were structurally related. Factor analysis is a multivariate technique which links the three variables in the Factors 1, 2 and 3 and two variables in the Factor 4 in such a way that only the unique contribution each of the eleven variables is considered for each factor. Thus factor analysis avoids potential problems of multicollinearity (Hair, Anderson, Tatham & Black, 1998).

The Cronbach’s alpha measures of reliability for the four factors were 0.8349 for Factor 1, 0.8787 for Factor 2, 0.8399 for Factor 3, 0.8209 for Factor 4. Since Cronbach’s alpha measures for each factor are above the traditionally acceptable value of 0.70, all of the factors were accepted as being reliable for the research.

#### ***Determining business performance criteria***

Exploratory factor analysis with varimax rotation was performed on the performance measurement criteria of the hospital in order to extract the dimensions underlying the construct. Performance of the hospitals was measured by using financial and non-financial indicators. Financial criteria include subjective measures such as revenue growth over the last three years, net profits, return on investment, profit to revenue ratio, cash flow from operations. On the other hand, non-financial criteria contain subjective measures such as reputation among major customer segments, capacity to develop a unique competitive profile, new product/ service development and market development. Non-financial criteria are based on executive’s perception of how the organization is performing relative to the competition.

The factor analysis of the 19 variables yielded two factors explaining 77.901% of total variance. Only nine of the nineteen items loaded on these two factors and, based on the items loading on each factor, the factors were labeled “*Financial factor*” (Factor 1), “*Non-financial factor*” (Factor 2). Factor loadings of these nine items are shown in Table 2.

Table 2

## Factor analysis for performance criteria

Variables	Factors	
	1	2
Revenue growth over the last three years	0.760	
Net profits	0.890	
Return on investment	0.663	
Profit to revenue ratio	0.896	
Cash flow from operations	0.761	
Reputation among major customer segments		0.888
Capacity to develop a unique competitive profile		0.803
New product / service development		0.836
Market development		0.852

The Cronbach's alpha measures of reliability for the two factors were 0.9092 for Factor 1, 0.9206 for Factor 2. Since Cronbach's alpha measures for each factor are above the traditionally acceptable value of 0.70, all of the factors were accepted as being reliable for the research.

#### *Canonical Correlation Analysis*

Canonical correlation analysis is a more general case of usual multiple regression. In multiple regression analysis, the aim is to find a linear combination of the independent (or predictor) variables such that the composite has the maximum correlation with the dependent (or criterion) variable. Canonical correlation analysis seeks to identify and quantify the associations between two sets of variables. It focuses on the correlation between a linear combination of the variables in one set and a linear combination of the variables in another set (Johnson, 2002). It can be used for both metric and nonmetric data for either the dependent or independent variables (Hair, Anderson, Tatham & Black, 1998). Canonical correlation analysis maximizes the correlation between variates.

$$U = \sum_{i=1}^p a_i x_i \quad V = \sum_{i=1}^q b_i y_i$$

The correlation between the two sets of variables is called canonical correlation. The coefficients are determined such that a linear combination of variables from the first set has the highest possible correlation with a linear combination of variables from the second set. These coefficients are called canonical coefficients. Standardized coefficients are used when the variables are not measured in the same units. A variable which has a high-standardized coefficient is loading heavily on its canonical variable and therefore is significant. If a variable is highly correlated with its canonical variable, its movement will be closely related to that canonical variable. Therefore, either a high-standardized canonical coefficient or a high correlation with its canonical variable signifies the importance of that variable. In general, the researcher faces the choice of interpreting the functions using canonical coefficients or correlations. It is suggested that correlations are superior to canonical coefficients (Hair, Anderson, Tatham & Black, 1998). Interpreting coefficients is sometimes misleading and dangerous, because intercorrelated predictors imply that the confidence intervals around the coefficients will be broad and that one variable may hide or suppress the importance of another variable correlated with the first (Levine, 1977).

#### *Results of Analysis*

In this study, canonical correlation was used to investigate the interrelationships between two sets of variables: the criterion set includes performance factors (financial and nonfinancial performance variables) while the predictor set consists of variables reflecting TQM factors (process management, quality data and reporting, employee relations, role of divisional top management

and quality policy). All the variables (except quality data and reporting) satisfy normality of Shapiro-Wilk, Anderson-Darling, Martinez-Iglewicz, Kolmogorov-Smirnov, D'Agostino Skewness, D'Agostino Kurtosis, D'Agostino Omnibus tests (quality data and reporting accepts normality of all the tests mentioned above except Shapiro-Wilk test).

Pearson correlations between performance and TQM variables are shown in Table 3. These correlations indicate that financial performance is positively correlated with quality data and reporting (at 1% significance level) and role of divisional top management and quality policy (at 10% significance level). Non-financial performance of hospitals is positively correlated with employee relations (significant at 1% level). Other correlations are not significant at 10 % significance level.

Table 4 displays the test statistics of canonical correlation. The first canonical correlation ( $R=0.56$ ) indicates a strong relationship between performance and TQM variables. Both canonical functions were found to be significant at an alpha level of .05 using Bartlett's chi-square test. Because the canonical correlations do not give the variance shared between the performance and TQM variables, Stewart and Love's redundancy index is obtained. The redundancy index is the mean variance of the dependent (or independent) set of variables that is explained by a particular canonical variate of the independent (or dependent) set. The proportion of variance in the performance variables predictable from or shared with the TQM variables is 24.8% and the proportion of variance in the TQM variables shared with the performance variables is 12.4% by the two canonical variates.

Table 3

Pearson Correlations between Performance and TQM Variables

	prcman	qualdata	emprel	role	fin	nonfin
prcman	1,00					
qualdata	0,00	1,00				
emprel	0,00	-0,00	1,00			
role	0,00	0,00	-0,00	1,00		
fin	-0,11	0,46*	0,02	0,26**	1,00	
nonfin	0,18	0,02	0,37*	0,17	0,00	1,00

\* Significant at 1% level, \*\* Significant at 5% level

Abbreviation :

Performance Variables

Fin: Financial Performance

Nonfin: Nonfinancial Performance

TQM Variables

Prcman: process management

Qualdata: quality data and reporting

Emprel: employee relations

Role: role of divisional top management and quality policy

Table 4

Canonical Correlations

Variate	Canonical		Num	Den	Prob	Wilks'
Number	Correlation	F-Value	DF	DF	Level	Lambda
1	0,554438	3,67	8	88	0,000974	0,561980
2	0,434271	3,49	3	45	0,023268	0,811409

Table 4 (continuous)

## Redundancy Index

Canonical	Variation	Explained	Individual	Cumulative	Canonical
Variate	in these	by these	Percent	Percent	Correlation
Number	Variables	Variates	Explained	Explained	Squared
1	TQM	PERF	7,7	7,7	0,3074
2	TQM	PERF	4,7	12,4	0,1886
1	PERF	TQM	15,4	15,4	0,3074
2	PERF	TQM	9,4	24,8	0,1886

Since there is no multicollinearity within the sets of performance and TQM variables, standardized canonical coefficients and loadings were found equal to each other. Therefore, interpretation of those would be the same. The canonical loadings are shown in Table 5. Canonical variable for the criterion set is a linear combination of the two performance variables (financial and non-financial). Canonical variable I shows that financial performance has the highest correlation (0.94) with its variable and therefore is the most important variable. Non-financial variable is also important and load onto the canonical variable. In the predictor set among the TQM variables the most important variable is the most heavily loaded variable, which is quality data and reporting; loading of 0.80 to its canonical variate indicates its importance. The role of divisional top management and quality policy is also highly correlated with its canonical variate (0.54). Financial performance on the dependent side is related to quality data and reporting and role of divisional top management and quality policy on independent side. Canonical variate II shows the strong association between non-financial performance measurement and employee relations.

Table 5

## Canonical Loadings

	U1	U2
prcman	-0,082930	-0,489085
qualdata	0,795663	0,322383
emprel	0,255362	-0,791371
role	0,542984	-0,174923
	V1	V2
fin	0,941988	0,335646
nonfin	0,335646	-0,941988

## Discussion

In this study, as it is mentioned above, implementation of TQM in healthcare industry in Turkey is found to have a strong correlation with business performance ( $R=0.56$ ). TQM model contains only four main factors: data reporting, role of top management, process management, and employee relations. Performance of hospitals consists of two dimensions: financial and non-financial factors.

There are many purposes for gathering data in quality management. Data can be collected to determine mortality and morbidity rate in hospitals to understand current processes. Moreover, data provide inspection, various test results and verification records. Data are also used to analyze the process using various types of statistical process control tools such as control charts, Pareto charts, cause and effect diagrams, check sheet, histograms, scatter diagram, and so on. These traditional quality tools are very useful in monitoring and measuring progress and performance. Management by facts requires that management decisions are based on relevant data and reports. In

this model, data and reporting have a very strong correlation with TQM and financial performance of the hospital.

In healthcare industry, successes of TQM applications depend on a strong leadership that must be initiated by the top management. Quality improvement plans proposed by several gurus emphasize primarily the commitment of top management. In this study, role of top management and quality policy has the second highest correlation with TQM plan. Top management of the hospitals determines an appropriate organization culture, vision, and quality policy. Managers of healthcare organizations should determine objectives, and set specific measurable goals to satisfy customer expectations and improve their organizations' performance. On the other hand, the top management must provide adequate resources to the implementation of quality efforts. This model implies that the managers' role has a direct impact on the financial performance of the hospitals. In order to increase net profit and revenue, and to reduce cost of quality, hospital managers must convey their priorities and expectations to their employees.

Employee relations, the third factor, have a sufficient correlation with TQM. In this model, employee relations have two variables. The first variable is building quality awareness among employees; the second one is recognition of employees for superior quality performance. Hospitals must develop formal reward and recognition systems to encourage employee involvement, and support teamwork. In this model, employee relations have a strong correlation with non-financial performance factor. Non-financial measures contain reputation, capacity of hospital, new service design, and new market development. Non-financial performance measures are better indicators of management effort and reflect the reasons for future financial performance (Hoque, 2003). Therefore, non-financial measures supplement financial measures in providing support for TQM. Hence, employee relations have also indirect impact on the financial performance of hospitals.

Fourth factor, process management, which includes such sub-factors as process monitoring, supervision, and preventive equipment maintenance, did not have sufficiently strong influence on TQM in this model. A possible reason for this might be the high level of personnel compliance with the implicit and explicit norms and rules of the workplace. Under such circumstances the marginal contribution to total quality of the inputs used for process management (inspection, supervision etc.) purposes would be expected to be low. This could explain the low value of the process management-coefficient in the model.

***Limitation and further research:***

- Sample size must be increased.
- Data should be gathered from more than one city in Turkey.
- Objective performance indicators should be employed in the analysis. In this study, data were collected from top managers of hospitals on the basis of their subjective evaluations.
- Structural equation modeling (SEM) or neural network model could be used in the future studies to utilize the additional insights they might provide.
- After using exploratory factor analysis, confirmatory factor analysis could be used.

**Conclusion**

TQM primarily focuses on the production of quality goods and services and the delivery of excellent customer service; however, its success increases when it is extended to the entire company. This enables the reformation of the corporate culture and the permeation of the new business philosophy into every facet of organization. The philosophy of doing things right must be implemented with enthusiasm and commitment throughout the organization – from top to bottom and the little steps forward (called “Kaizen” by the Japanese) must be viewed as “a race without a finish”. Consequently, effective use of TQM is a valuable asset in a company's resource portfolio – one that can produce important competitive capabilities and be a source of competitive advantage.

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## Appendix A

### ***1. Role of Top Management and Quality Policy***

1. Extent to which top executives assume responsibility for quality performance.
2. Acceptance of responsibility for quality by major department heads.
3. Degree to which top management (top executive and major department heads) is evaluated for quality performance.
4. Extent to which top management supports a long term quality improvement process.
5. Extent to which the top management has objectives (Management By Objectives) for quality performance.
6. Importance attached to quality by top management in relation to cost/revenue objectives.
7. Degree to which top management considers quality improvement as a way to increase profits.
8. Degree of comprehensiveness of the quality plan.
9. Extent to which top management has developed and communicated a Vision for Quality as part of a Strategic Vision of the Organization.

### ***2. Process Management/Operating Procedures***

1. Use of statistical control charts to control processes.
2. Amount of preventive equipment maintenance.
3. Amount of inspection, review or checking of work.
4. Importance of inspection, review or checking of work.
5. Stability of work schedules.
6. Clarity of work or process instructions given to employees.

### ***3. Quality Data and Reporting***

1. Availability of cost of quality data in the hospital.
2. Availability of quality data (mortality and morbidity, etc.).
3. Timeliness of quality data.
4. Extent to which quality data (cost of quality, mortality and morbidity, errors, etc.) are used as tools to manage quality.
5. Extent to which quality data are available to managers and supervisors.
6. Extent to which quality data are used to evaluate supervisor and managerial performance.
7. Extent to which quality data, control charts, etc. are displayed in work areas.
8. Scope of the quality data includes clinical performance and service/process performance.

### ***4. Employee Relations***

1. Extent to which employee involvement type programs are implemented in the hospital.
2. Effectiveness of quality teams or employee involvement type programs in the hospital.
3. Extent to which the employees are held responsible for error free output.
4. Amount of feedback provided to the employees on their quality performance.
5. Degree of participation in quality decisions by hourly/non-supervisory employees.
6. Extent to which quality awareness-building among employees is on-going.
7. Extent to which employees are recognized for superior quality performance.

## **Appendix B**

### ***1. Performance***

1. Revenue growth over the last three years.
2. Service quality as perceived by customers.
3. Market share gain over the last three years.
4. Investments in R&D aimed at new innovations.
5. Net profits.
6. Return on investment.
7. Reputation among major customer segments.
8. Capacity to develop a unique competitive profile.
9. Profit to revenue ratio.
10. Cash flow from operations.
11. New product/service development.
12. Market development.
13. Cost per adjusted discharge.
14. Mortality and Morbidity rate.
15. Return on Assets.
16. Employee Turnover.
17. Number of Admissions.
18. Share of net patient revenue.
19. Market Orientation.

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